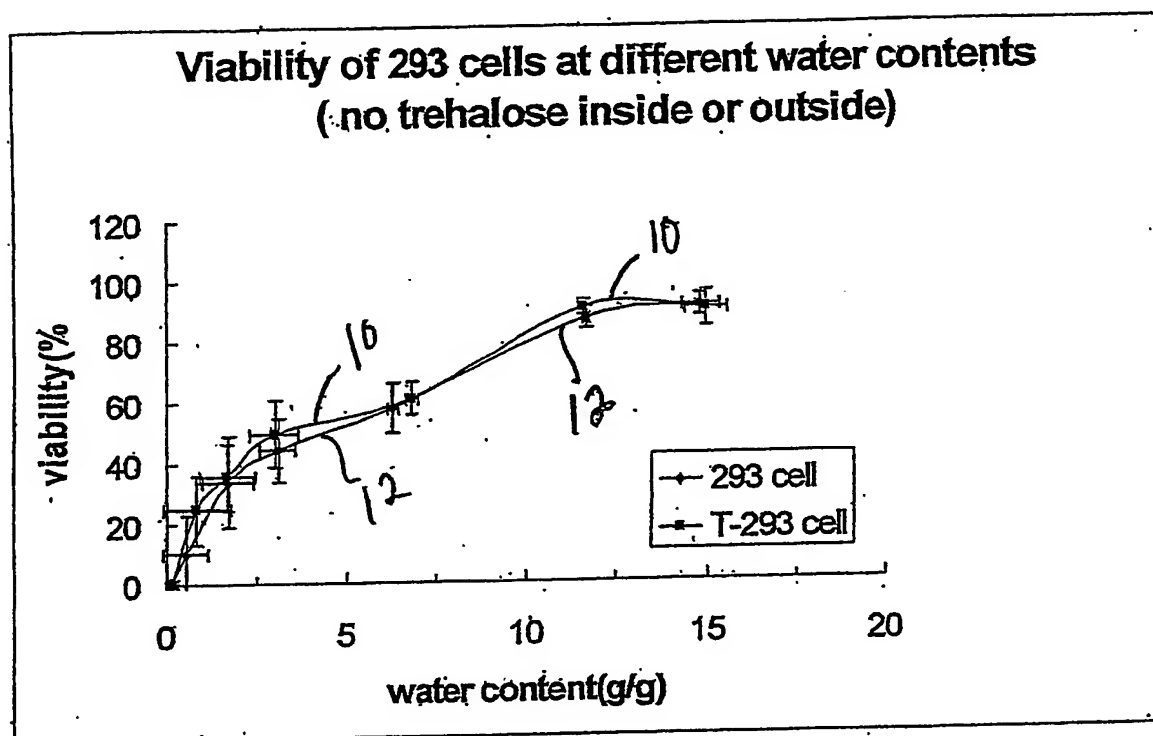


Fig. 1



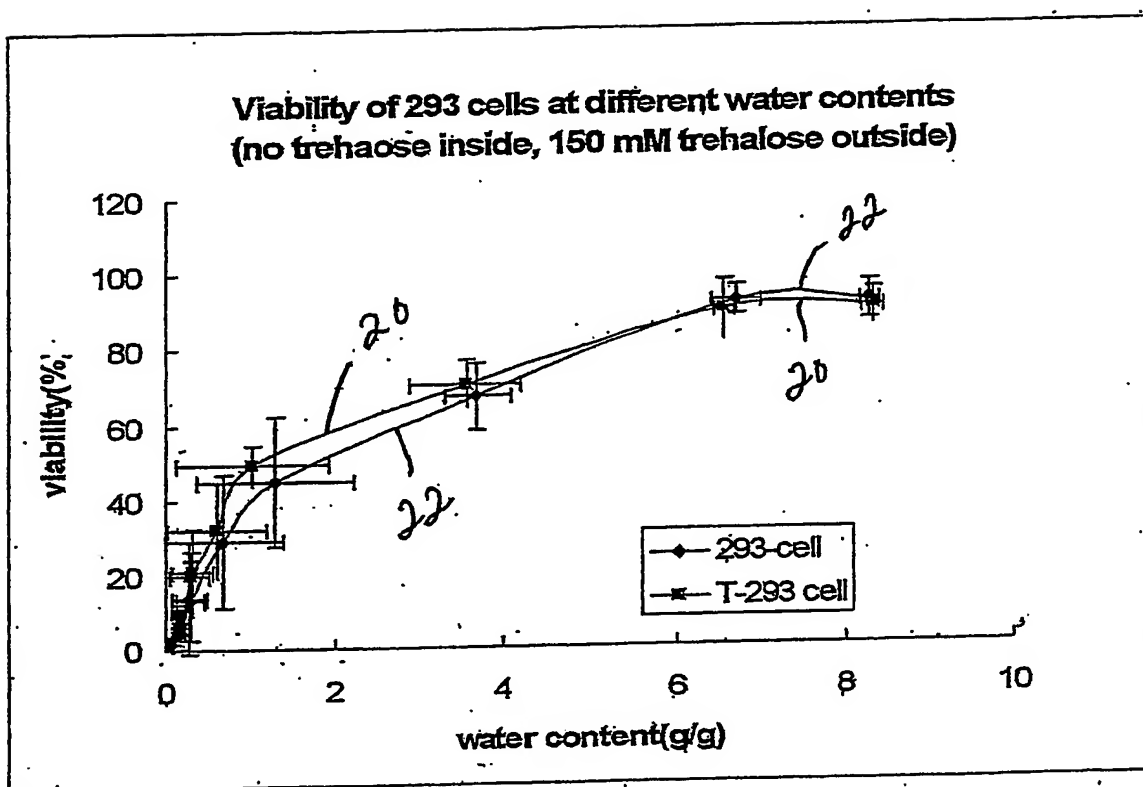


Fig. 3

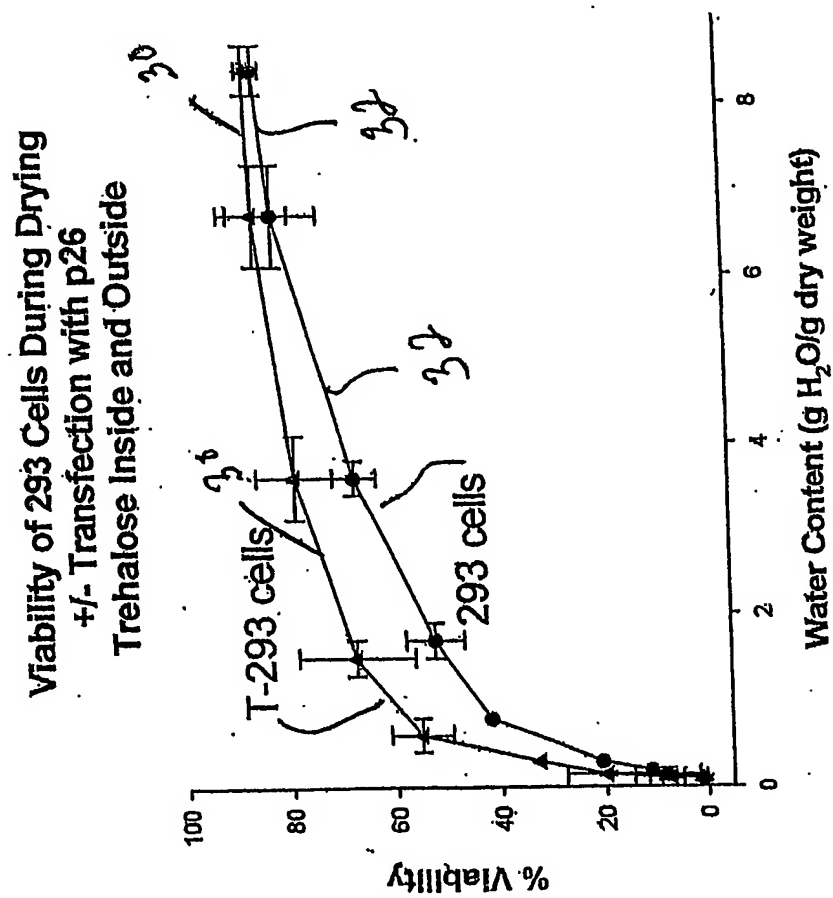
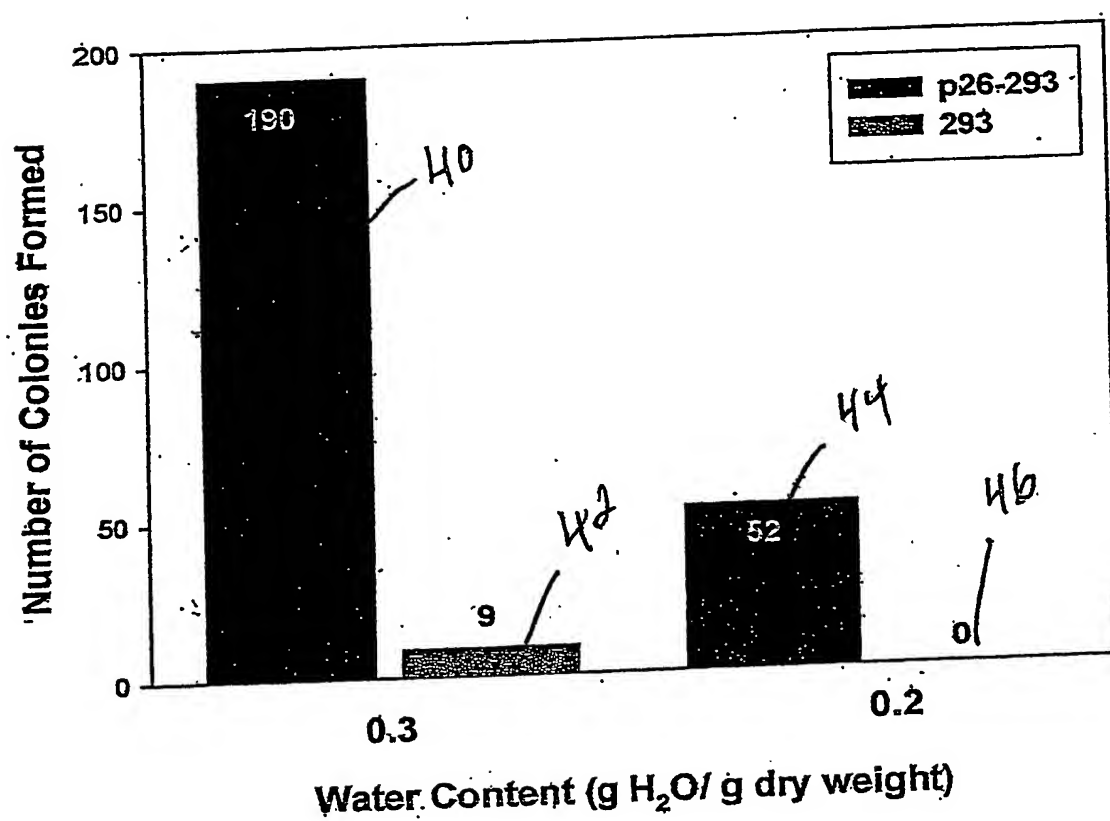


Fig. 4



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Fig. 5

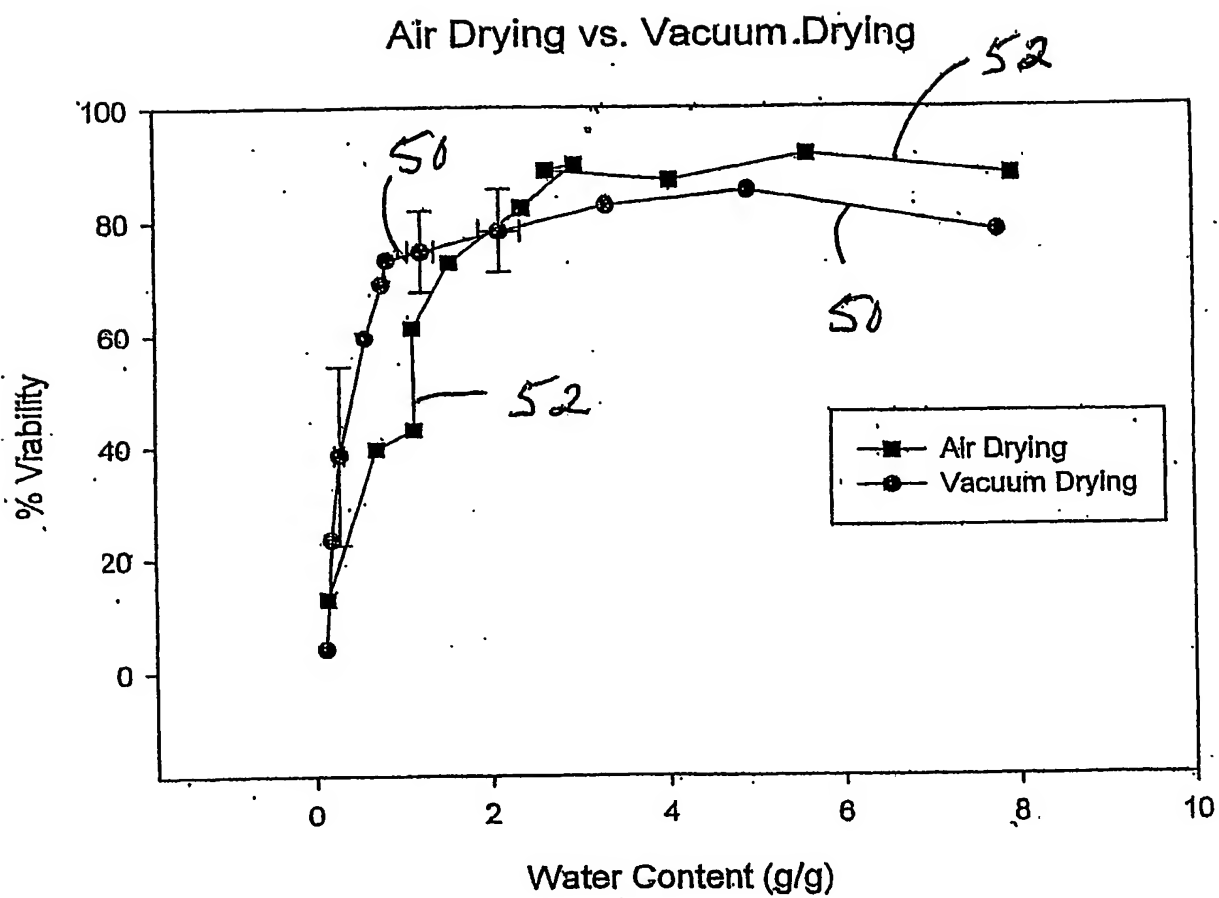


Fig. 6

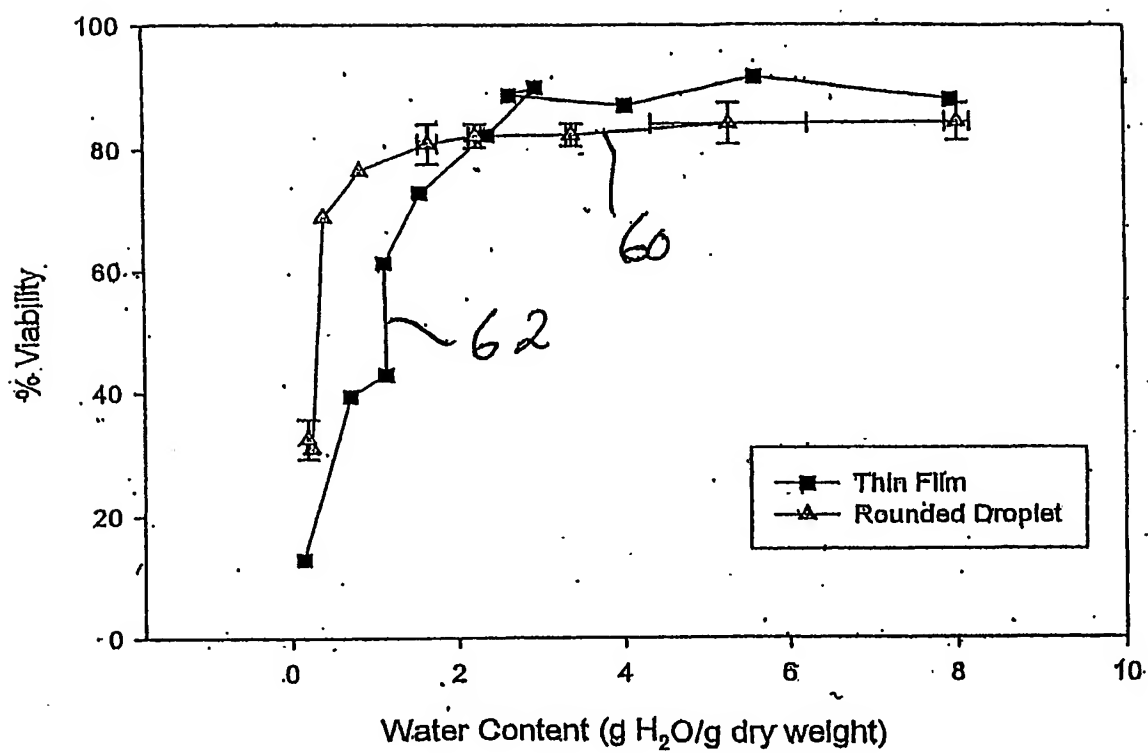


Fig. 7

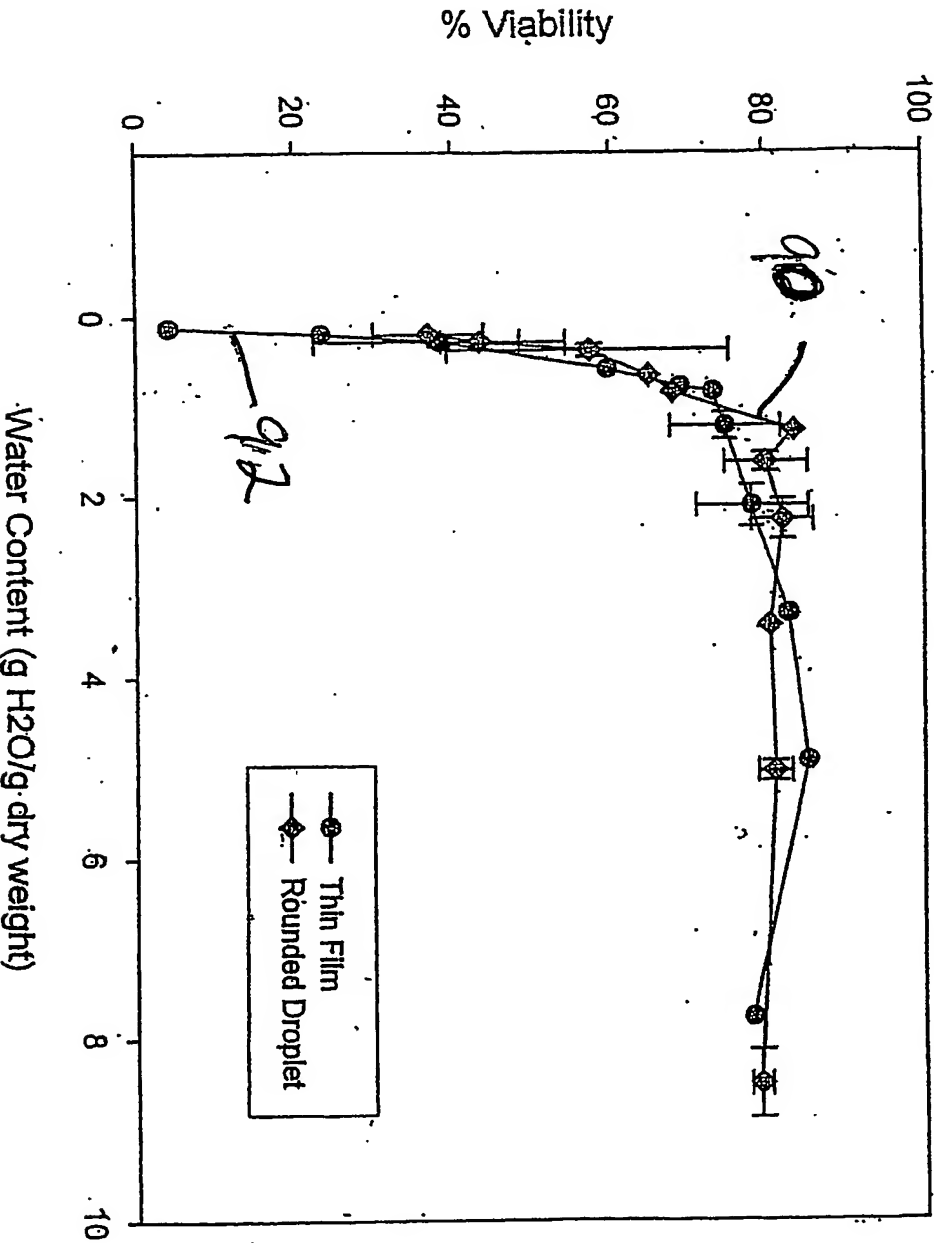


Fig. 8

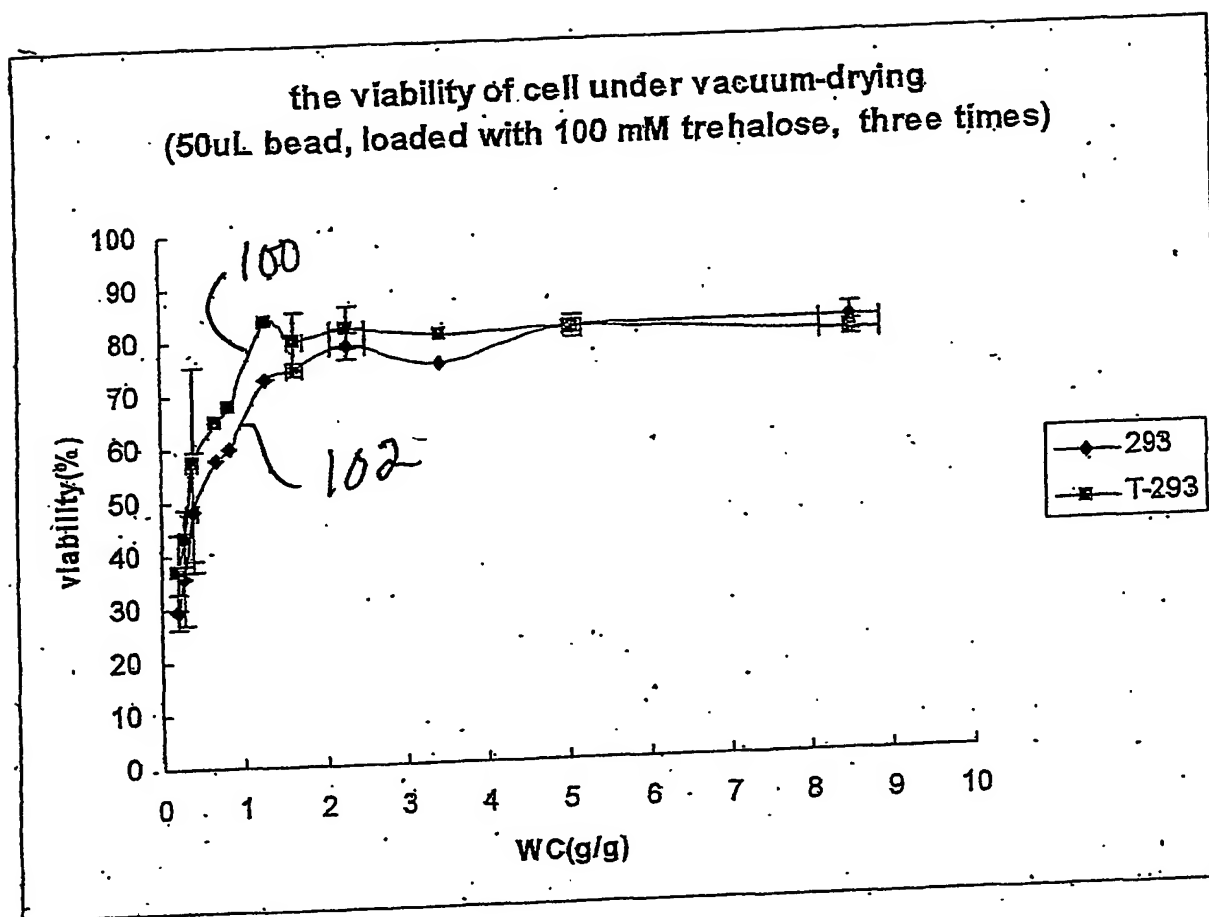




Fig. 9A

## Flow Chart for Preserving Nucleated Cells

Nucleated cells in culture

Nucleated cells (e.g. mesenchymal stem cells, 293H cells, HeLa cells, murine B cells, etc.): grow in medium appropriate for cell type) to ~95% confluence.

+/- Adding heat shock protein

Cells are engineered to express p26, from *Artemia*, or other heat shock proteins, (or they are loaded with p26 or other heat shock proteins by endocytosis or protein transporter treatments).

Disaccharide loading

Incubate cells in standard growth medium containing 100 mM disaccharide, e.g., trehalose (or 75 mM for B cells) for 24 h at 37 °C, 5% CO<sub>2</sub>, and 90% RH.

+/- DMSO treatment

During final hours of disaccharide incubation, add 2% DMSO to the incubation solution to increase the intracellular distribution of disaccharide.

+/- Arbutin or hydroquinone

During disaccharide incubation, include arbutin @ 40 mM and disaccharide at 70 mM.

+/- Apoptosis Inhibitor

During disaccharide incubation, include apoptosis inhibitor at 30  $\mu$ M.

Transfer to drying buffer

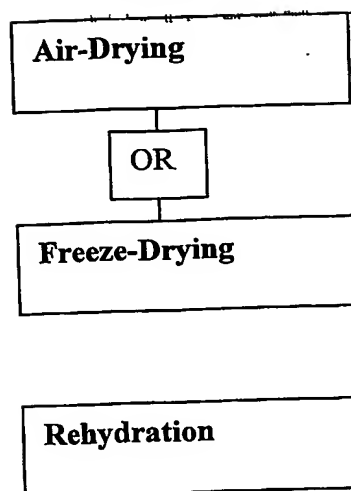
Harvest cells by trypsinization. Spin cells gently (<1000 rpm, 10 min) to pellet. Remove supernatant. Resuspend cells in drying buffer (10 mM Hepes, 5 mM KCl, 65 mM NaCl, 150 mM trehalose, and 5.7% BSA with pH 7.2). In case of arbutin- or hydroquinone- containing cells, resuspend in arbutin- or hydroquinone- containing drying buffer (10 mM Hepes, 5 mM KCl, 30 mM NaCl, 150 mM trehalose, 70 mM arbutin or hydroquinone, and 5.7% BSA with pH 7.2).

Vacuum-Drying

OR

Samples dried in 50  $\mu$ L aliquots in the shape of rounded droplets in the caps of Eppendorf microfuge tubes, at room temperature (or in the temperature range of 25 – 42 °C) under a vacuum (pressure ~3 in Hg) to 0.2-0.5 g H<sub>2</sub>O/g dry weight. Samples dried in 50  $\mu$ L aliquots in the shape of rounded droplets in the caps of Eppendorf microfuge tubes (or in 0.5 mL

Fig 9B



aliquots in sterile Petri dishes), at room temperature under a diffuse stream of dry air to 0.2-0.5 g H<sub>2</sub>O/g dry weight.

Cell samples dried in a 10-droplet array (where each drop contains a volume of 50  $\mu$ L) within BioDRI Flasks on a Lyostar shelf style lyophilizer.

Rehydrate the samples in excess growth medium (+/- arbutin, +/- apoptosis inhibitor). Replate the cells (on an adhesive surface, such as collagen, fibronectin, or vinculin), and grow in culture at 37 °C, 5% CO<sub>2</sub>, and 90% RH. Use the cells for clinical or in vitro applications, as desired.